REMARKS

A. This Amendment is in place of the Amendment Under 37 C.F.R. §1.116 filed May 9, 2003. Thus, Applicants respectfully request that said prior Amendment filed May 9, 2003, not be entered and that the instant Amendment be considered in its place.

B. Applicants thank the Examiner for the very helpful telephonic interview conducted on September 16, 2003, and the follow-up telephone conversations thereto. Enclosed herewith is Applicants' Interview Summary.

C. Claims 1-4, 11-14 and 21 are all the claims pending in the application; claims 1-3, 11-14 and 21 are rejected; claim 4 is allowed.

After entry of the amendment, claims 1-4, 11, 13-14 and 22 will be pending.

The claims have been amended to more fully comply with U.S. format and to more clearly state that which Applicants regard as their invention. In addition, the following specific amendments have been made.

Claims 1 and 11 have been amended to recite "wherein said polypeptide has activity at pH 2.5 to 3." Support for this amendment may be found at page 47, line 25 through page 48, line 1, of the specification. These claims have also been amended to more fully describe the disaccharide glycosides upon which the polypeptides of the claims have activity (those having a glucose moiety at the aglycon side). Support for this amendment may be found at page 6, lines 21-22, where it is disclosed that the disaccharide glycosides upon which the polypeptides of the present invention have activity are those having glucose on the aglycon side. These claims have further been amended to recite the specific microorganisms from which the polypeptides may be isolated. Support for this amendment may be found at page 12, lines 12-18.

Claim 1 has also been amended to recite polypeptides with an approximate molecular weight of about 47 kDa to about 51 kDa. Applicants note that there are different manners in which the molecular weight of a polypeptide may be calculated. As described in the specification, the approximate molecular weight as determined by SDS-PAGE for an exemplary polypeptide of the genus recited in claim 1 (i.e., SEQ ID NO:8) is 47 kDa (page 47, lines 8-10, of the specification). And, as described in the enclosed executed Declaration Under 37 C.F.R. §1.132 by Shigeru Yamamoto, the approximate molecular of the same polypeptide by computer algorithm based on amino acid sequence is about 51 kDa. One skilled in the art would readily understand that an apparent molecular weight, as estimated by SDS-PAGE or computer algorithm, may different somewhat depending on the method used to determine the molecular weight (see also the Yamamoto Declaration). Thus, recitation of the structural feature "about 47 kDa to about 51 kDa" is fully supported and not new matter.

Claim 2 has been amended to recite specific disaccharide glycosides. Support for the amendment may be found in the specification at page 76, last paragraph.

Claim 3 has been amended to recite a 95% homology with SEQ ID NO:8. Support for the amendment may be found at page 16, lines 12-17.

Claim 11 has been further amended to recite the specific culturing conditions under which the polypeptide of the present invention may be produced.. Support for this amendment may be found at page 14, lines 4 and lines 13-17.

Claim 12 is canceled.

Support for new claim 22 may be found at page 54, lines 8-9.

No new matter has been added. Entry of the amendment is respectfully requested.

I. Claim Rejections - 35 U.S.C. § 112, Second Paragraph

At page 2 of the Office Action, paragraph 2, claims 1-3 and 11-14 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

A. Regarding the recitation of "analogous disaccharide glycoside" in claim 2, the Examiner maintains the position that the scope of "analogous" is unclear, as set forth in the previous Office Action.

In response, Applicants include herewith an amendment to claim 2 such that specific disaccharide glycosides are now recited in the claim. Support for the amendment may be found in the specification at page 76, last paragraph.

In view of the amendment to the claim, Applicants assert that claim 2 is definite as written and therefore respectfully request reconsideration and withdrawal of this rejection.

B. Regarding claims 1-2 and 11-14, the Examiner asserts that the recitation of "a substantial activity" is indefinite because of lack of a definition of the term "substantial."

In response, Applicants include herewith an amendment to claims 1 and 11 deleting the term "substantial."

In view of the amendment to the claims, Applicants assert that claims 1 and 11 are definite as written and therefore respectfully request reconsideration and withdrawal of this rejection.

II. Claim Rejections - 35 U.S.C. § 112, First Paragraph

A. At page 3 of the Office Action, paragraph 3, claims 1, 2 and 11-14 are rejected under 35 U.S.C. § 112, first paragraph, as lacking adequate written description support in the specification.

The Examiner indicates that this is a new matter rejection. The Examiner states that although the limitation of "stable at 50°C or less" is supported by Applicants' specification (page 50, line 2), the limitation of "has a substantial activity even at a pH 3 or less" is not supported by original specification, claims or figures of the present application.

In response, Applicants included herewith an amendment to the claims such that the phrase "wherein said polypeptide has a substantial activity even at a pH 3 or less" has been canceled from the claims.

In place of the noted phrase, the claims now recite "wherein said polypeptide has enzymatic activity at pH 2.5 to 3." Support for this amendment may be found at page 47, line 25 through page 48, line 1, where it is stated that for the diglycosidase derived from *Aspergillus fumigatus*, "its optimum pH was from 2.5 to 3.0."

In view of the amendment to the claims, Applicants assert that cited claims have adequate written description support, and therefore respectfully request reconsideration and withdrawal of this rejection.

B. At page 4 of the Office Action, paragraph 4, claims 1-3 and 11-14 are rejected under 35 U.S.C. §112, first paragraph, as lacking adequate written description support.

The Examiner states that the polypeptides recited in claims 3 and 21 are not limited to a particular substrate or to those relevant identifying characteristics of pH and temperature tolerance as recited in claims 1 and 11.

The Examiner also asserts that the only two species of enzymes or polypeptides disclosed in the specification are both isolated from a single microorganism, and are not representative species of the genus of enzymes and polypeptides as presently claimed.

The Examiner further asserts that the relevant identifying characteristics of having activity at pH 3 or less and stability at 50°C or less are insufficient to describe the structures of recited genus.

In response, Applicants include herewith a number of amendments to the claims, with the result that the amended claims have adequate written description support in the specification.

For example, the claims now recite a well defined group of polypeptides, with well defined features. First, each of the polypeptides recited in the rejected claims has a specific activity ("act upon a disaccharide glycoside to thereby release saccharides from said disaccharide glycoside in a disaccharide unit), and act upon a small group of disaccharide glycosides ("wherein said disaccharide glycoside has a glucose moiety at the aglycon side"). Second, each of the polypeptides recited in the rejected claims has specific physical properties, including activity at a low pH (2.5 to 3), and a stability at high temperatures of up to 50°C. In addition, each of the polypeptides recited in claims 1 and 2 have an apparent molecular weight in a range of about 47 kDa to about 51 kDa. Third, each of the polypeptides recited in the rejected claims is isolated from a defined source

("the genus *Aspergillus*, the genus *Penicillium*, the genus *Rhizopus*, the genus *Rhizomucor*, the genus *Talaromyces*, the genus *Mortierella*, the genus *Cryptococcus*, the genus *Microbacterium*, the genus *Corynebacterium* and the genus *Actinoplanes*"). Finally, the polypeptide variants recited in claim 3 (please note that claim 21 has been canceled) are also well defined based on homology to SEQ ID NO:8 ("at least 95%"), and many of the functional and specific physical properties recited in claim 1.

Method claim 11 has also been amended to incorporate each of these elements as well as to recite specific culture conditions for the microorganism.

Therefore, Applicants assert that the recited genus of polypeptides is adequately defined in the specification, and the skilled artisan would easily be able to recognize the identity of members of the genus and that Applicants were in possession of the claimed invention.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

C. At page 6 of the Office Action, paragraph 5, claims 1-3, 11-14 and 21 are rejected under 35 U.S.C. § 112, first paragraph, as being non-enabled.

The Examiner maintains the rejection as to the enzymes, polypeptides, and microorganisms for the reasons set forth in the previous Office Action. Briefly, the Examiner states that Applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed invention in a manner reasonably correlated with the scope of the claims; which broadly includes *all* diglycosidases, methods of producing diglycosidases by culturing *any* microorganism in a nutrient medium that

contains *any* substance that induces production of an enzyme having diglycosidases activity.

In response, Applicants refer to the comments above concerning the amendment of the claims under **II. B.**, and incorporate them herein. In view of the amendments, and in contrast to the Examiner's position, the claims do not recite *all* diglycosidases. The diglycosidases recited in the claims are limited to a small group based on activity, physical properties and source.

Similarly, the method claims do not recite methods of producing diglycosidases by culturing *any* microorganism in *any* nutrient medium that contains *any* substance that induces production of an enzyme having diglycosidases activity. Instead, the claims recite a defined group of microorganisms (see claim 11), a defined substance ("saccharide"), and specific culture conditions.

In view of the amendments to the claims, and the points discussed above, Applicants assert that the claims are fully enabled and therefore respectfully request reconsideration and withdrawal of this rejection.

III. Claim Rejections - 35 U.S.C. §102/103

A. At page 8 of the Office Action, paragraph 8, the rejection of claims 1, 3 and 11-13 under 35 U.S.C. §102(b), as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over McCormack et al., has been maintained.

The Examiner states that McCormack et al. teaches a method of producing an enzyme having chitobiase activity by culturing a *Talaromyces* species, and that

McCormack et al. further teaches isolating the enzyme by centrifuging the cells and collecting the supernatant comprising the enzyme for further analysis.

The Examiner also states that chitin used in McCormack et al. is considered a glycoside by various sources.

In response, Applicants include herewith an amendment to the claims such that the claims recite a polypeptide with an activity to act upon a disaccharide glycoside "wherein said disaccharide glycoside has a glucose moiety at the aglycon side." Thus, the polypeptides of the present application have a specific enzymatic activity. As described in Examples 12 and 14 of the specification, a disaccharide (primeveroside) and an aglycon are released by allowing the diglycosidase of the present application to act on eugenylprimeveroside as a substrate. Example 16 reveals a similar result when a diglycosidase of the present application acts on other disaccharide glycosides as substrates.

In contrast, chitinase is an enzyme which acts on chitin, which is a polysaccharide. While chitin may be considered to be a glycoside, cleavage of chitin with chitinase does not produce an aglycon (the non-saccharide) while a diacetylchitobiose (a disaccharide) is released. Accordingly, the enzyme disclosed in McCormack et al. is quite different from that of the present application.

Thus, there is no disclosure in McCormack et al. of a polypeptide with the same activity. As chitin is <u>not</u> a disaccharide glycoside that has a glucose moiety at the aglycon side of the disaccharide glycoside, the chitobiase of McCormack et al. cannot be said to be a polypeptide with the same activity as the polypeptides of the instant application.

Furthermore, the polypeptide of McCormack et al. does not make obvious the polypeptides of the present invention. There is no indication in McCormack et al. that the polypeptide taught therein would be expected to have a broad substrate range such that it would also recognize and cleave the bond between an aglycon and a saccharide chain, as recited for the polypeptides of the pending claims.

In view of the absence of any teaching or suggestion in McCormack et al. of a polypeptide having the activity recited in the claims of the present application, Applicants assert that McCormack et al. does not teach or suggest the present invention and therefore respectfully request reconsideration and withdrawal of this rejection.

B. At page 9 of the Office Action, paragraph 9, the rejection of claim 3 under 35 U.S.C. §103(a) as being unpatentable over Harman et al., has been maintained.

The Examiner states that Harman et al. teaches an enzyme isolated from *Trichoderma harzianum* stain P1 having chitobiase activity.

In response, Applicants refer to their arguments above concerning the rejection of the claims over McCormack et al. and incorporate them herein.

As with McCormack et al., Harman et al. does not teach or suggest a polypeptide with the same activity as the polypeptides of the present invention. The polypeptide of Harman et al. has chitobiase activity, and the recited activity of the polypeptides of the present invention is one that recognizes and cleave the bond between an aglycon and a saccharide chain. As chitin is <u>not</u> a disaccharide glycoside that has a glucose moiety at the aglycon side of the disaccharide glycoside, the chitobiase of Harman et al. cannot be said to be a polypeptide with the same activity as the polypeptides of the instant application.

Further, there is no suggestion in Harman et al. that the polypeptide taught therein would have the ability to also recognize and cleave the bond between an aglycon and a saccharide chain, as recited for the polypeptides of the present invention.

In view of the absence of any teaching or suggestion in Harman et al. of a polypeptide having the activity recited in the claims of the present application, Applicants assert that Harman et al. does not teach or suggest the present invention and therefore respectfully request reconsideration and withdrawal of this rejection.

IV. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

23373

PATENT TRADEMARK OFFICE

Drew Hissong
Registration No. 44,765

Date: October 17, 2003

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q63731

Shigeru YAMAMOTO, et al.

Appln. No.: 09/806,413

Group Art Unit: 1652

Confirmation No.: 8678

Examiner: David J. Steadman

Filed: March 30, 2001

For: NOVEL ENZYME COMPOSITION AND PRODUCTION METHOD AND USE THEREOF

STATEMENT OF SUBSTANCE OF INTERVIEW

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please review and enter the following remarks summarizing the interview conducted on September 16, 2003:

REMARKS

An unsigned copy of the Examiner's Interview Summary Record (PTO-413) was provided to Applicants on September 16, 2003.

During the interview, the following was discussed:

1. Brief description of exhibits or demonstration: None.

2. Identification of claims discussed: All pending.

3. Identification of art discussed: None.

4. Identification of principal proposed amendments: Amendment to claim 1 to include at least one additional structural feature (such as molecular weight or pI); amendment to

claim 3 to recite a higher degree of homology; amendment to claim 11 to include details on the composition of the culture media.

5. Brief Identification of principal arguments: The Examiner stated that additional structural features were required to satisfy the written description requirements, that the homology recited in claim 3 was too low to satisfy the written description requirements, and that the culture conditions in claim 11 were too broad to satisfy the written description requirements.

6. Indication of other pertinent matters discussed: None.

7. Results of Interview: Applicants agreed to consider amending the claims as the Examiner suggested.

It is believed that no petition or fee is required. However, if the USPTO deems otherwise, Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Drew Hissong
Registration No. 44,765

Date: October 17, 2003